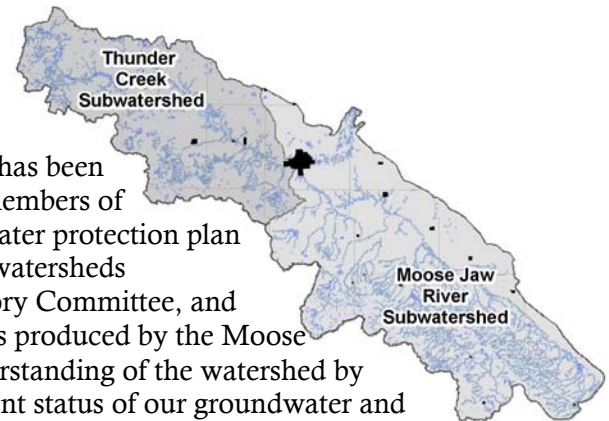


The Moose Jaw River Watershed

A whole-ecosystem approach to water conservation and water quality protection depends on the management of watersheds - units that envelop entire water systems. The Saskatchewan Watershed Authority has been working with local municipalities and other interest groups (including members of the Moose Jaw Creek Watershed Association #2) to develop a source water protection plan for the Moose Jaw River watershed. This plan covers issues within subwatersheds of Thunder Creek, represented by the Thunder Creek Watershed Advisory Committee, and Moose Jaw River. During the planning process, a *Background Report* was produced by the Moose Jaw River Watershed Technical Committee to provide a collective understanding of the watershed by identifying existing landforms, habitats, land use patterns, and the current status of our groundwater and surface water systems.



The *Background Report* can be found online at www.swa.ca/stewardship/watershedplanning/

General Watershed Information

The Moose Jaw River watershed, located in south-central Saskatchewan, encompasses 9,360 km² – with the majority of the water coming from the south-eastern portion of the watershed. The Moose Jaw River is joined by Avonlea Creek near the town of Rouleau, and flows toward the City of Moose Jaw. Most water from Thunder Creek is retained in Pelican Lake, while water from Sandy Creek, a tributary originating in the Missouri Coteau, meets the Moose Jaw River at the City of Moose Jaw. Past the City, the River meets up with the Qu'Appelle River approximately 5 km downstream of Buffalo Pound Lake. The Moose Jaw River is the largest tributary flowing into the Qu'Appelle River.

The Moose Jaw River watershed encompasses two main physiographic regions - the Alberta Plateau and the Saskatchewan Plains. The Alberta Plateau, represented by the Missouri

Coteau, is a series of hummocky landscapes along the lower and western edges of the watershed. The Saskatchewan Plains has a variety of topographical features including moraine, lake plains, river valleys, spillways, and other minor landforms.

The Moose Jaw River watershed supports habitat for a wide diversity of organisms, including some that have been identified under the *Species at Risk Act*. The black tailed prairie dog, burrowing owl, piping plover, sage grouse, and peregrine



falcon are just a few examples classified as either endangered, threatened, or of special concern.

The burrowing owl is a species at risk within the Moose Jaw River watershed. www.speciesatrisk.gc.ca

The Prairie Pothole Region of North America – which includes the Missouri Coteau, is one of the most important regions on the continent for migratory waterfowl.

The Moose Jaw River supported a seasonal pike fishery up to the middle of the 20th century. The construction of small dams and weirs accompanied by water quality deterioration caused a steady decline in pike population. Today, northern pike, yellow perch, walleye, virile crayfish, river shiner, brook stickleback and white sucker are either found within the Moose Jaw River or in the Avonlea Reservoir, but their migration throughout the watershed is limited by numerous water-holding structures.

Agricultural Land Use

The dominant land use in the watershed is agriculture, with 70% of the agricultural land used for annual crops. Common crops throughout the watershed include spring wheat, durum wheat, CPS wheat, feed barley, oats, flax, lentils, canary seed, canola and mustard. Pulse crops are typical for the area of the watershed north of Moose Jaw.

A further 18% of the watershed is grassland - the majority of which is located along the western portion of the watershed in the Missouri Coteau.

The Missouri Coteau is well suited to forage development. Although significant forage acres have already been developed, there are still opportunities to increase this amount. Producers have taken advantage of programs such as voluntary stewardship agreements offered by Saskatchewan Watershed Authority, and conservation easements offered by organizations such as Ducks

Unlimited and Nature Conservancy of Canada to increase the amount of forage acres in the area.

The cow-calf industry is concentrated in the western half of the watershed. Cattle densities average from 8,000 to 12,000 head per rural municipality. Densities are lower in the southern portion of the watershed around Avonlea, where numbers average 4,000 to 8,000 head per rural municipality.

The feedlot industry for the watershed is predominately located in and around Moose Jaw. Feedlots in the watershed range in capacity from less than 300 head to greater than 6,000 head.

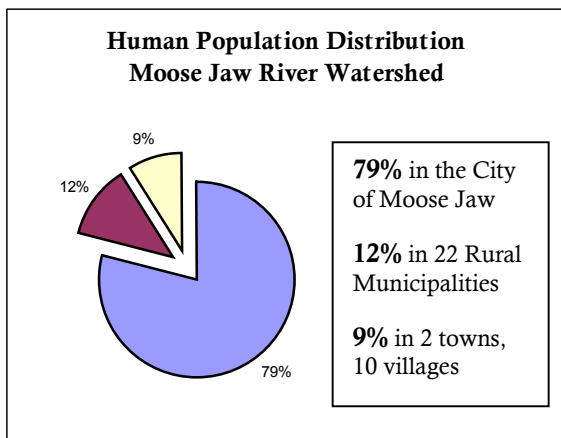


Photo courtesy of SWA

There are currently three dairy farms operating in the watershed.

Presently, there are four approved intensive hog operations.

Social Characteristics



Based on the 2001 census data, approximately 40,500 people live in the Moose Jaw River watershed. The average population of the watershed has declined by approximately 1,000 people between the 1996 and the 2001 census. Most of the population is centered around the City of Moose Jaw with those rural municipalities closest to the city having higher populations than those which are further away.

Population concentration determines the amount of water used and wastewater produced in a given area. While the source of water supplying the City of Moose Jaw is outside the watershed, treated effluent and untreated storm water may have impacts on the Moose Jaw River in terms of both quality and quantity.

Tourism plays an important role for the economy of the region. Within the watershed, there are four golf courses, Dunnet Regional Park, Buffalo Pound Provincial Park, and numerous local parks including Wakamow Valley and Crescent Park - all of which would be adversely affected by a decline in water quality. Wakamow Valley has already felt the impacts of poor water quality, when in the mid 1900s they had to shut down their swimming venue in Kiwanis River Park.

Water Resources

Groundwater, stored in aquifers, and surface water are nearly inseparable because they "feed" each other. With groundwater replenishing streams and reservoirs, and precipitation recharging groundwater supplies, contamination is easily transferred between the two systems.

Typically, groundwater throughout the watershed is considered to be of poor quality. However, some groundwater of higher quality may also be found, such as in the area immediately south west of Caron.

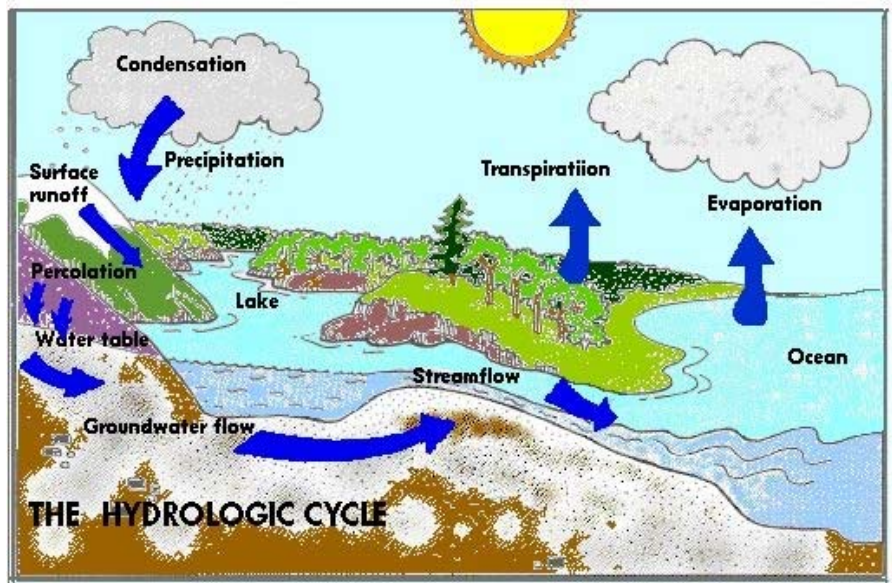


Figure courtesy of SWA

Groundwater

Yields for wells situated in bedrock aquifers are limited. In general, a yield between 33 and 65 m³/day is normal from such a source.

Well yields from glacial aquifers are much more variable depending on the extent and thickness of the aquifer, as well as the nature of the material it is made up of. Some well yields are only adequate for an individual household, while others

may have sustainable yields much greater than 650 m³/day. The majority (94%) of groundwater allocations are for municipal purposes. Urban distribution, tankload, recreation, institutional, and commercial facilities are all included under municipal distribution. Many villages throughout the watershed draw on groundwater for their urban distribution systems.



Poor wellhead protection and improper decommissioning can lead to contamination of a groundwater supply.
Photo courtesy of SWA.

Surface Water

There is considerable variability in annual flow volumes in the Moose Jaw River watershed, ranging from 375,000,000 m³ to zero in drought years.

There are many existing dams and weirs on the Moose Jaw River and its tributaries. These structures are used to supply water for various purposes, including domestic water supply and livestock watering.

Irrigation is the largest user of water sourced in the watershed, with 156 irrigation projects using 11,144,000 m³ of surface water per year to irrigate 5,278 ha of land.

There are three organized irrigation districts within the watershed:

1. **Thunder Creek Irrigators** use water from local runoff and the Riverhurst Irrigation Project.
2. **The Baidon Water Users** use effluent irrigation from the City of Moose Jaw.
3. **The Avonlea Water Users** manage irrigation releases from the Avonlea Reservoir.

Water Quality

Water quality is an important consideration in the Moose Jaw River watershed because it has the potential to immediately influence the quality of recreation, wildlife, fish, livestock and irrigation. Because the Moose Jaw River flows into the Qu'Appelle River, water quality can directly impact the quality of drinking water for some communities on the Qu'Appelle. The quality of water in the Avonlea Reservoir is also important, as it is the source of drinking water for the Village of Avonlea and surrounding area.

Between 1973 and 2002, the overall trend on the Moose Jaw River saw a decline in total ammonia and dissolved nitrogen concentrations, and declining or no trend for total phosphorous. Downstream of the City of Moose Jaw, chloride concentrations are decreasing while sodium levels are increasing. Because of limited data, it is not yet possible to determine the sources of increased sodium levels.

It is important to note that the majority of the samples were collected during wastewater effluent releases. A regular sampling program with monitoring during flow periods and outside of wastewater releases is required to allow in depth conclusions to be drawn from the trends. Such a program would also allow incorporation of the Water Quality Index (WQI). The WQI is an effective means for summarizing a large number of water quality parameters and provides an indication of overall water quality. The index compares values for various water quality parameters (i.e. nutrients, dissolved minerals, metals) to water quality objectives. The results of those comparisons are combined to provide a water quality ranking system (excellent, good, fair, poor) on a scale of 0 to 100.



Blooms of blue-green algae, common to water bodies in southern Saskatchewan, are triggered by low levels of available nitrogen. With the ability to fix nitrogen, this group of algae contributes to toxin production and oxygen depletion of lakes and ponds. Photo courtesy of SWA.

The Moose Jaw Creek Watershed Association #2 takes pride in working with local communities, landowners and partner agencies to improve water quality and quantity within the watershed. With funding available, we can assist with projects that demonstrate management practices that are in accordance with our plan for the protection of water quality in the Moose Jaw River watershed. If you would like to know more about how to be involved in our programs, please contact our technical coordinator at:

Moose Jaw Creek Watershed Association #2

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**Government of
Saskatchewan**